MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

PSP 0101 – PROBLEM SOLVING AND PROGRAM DESIGN / PSP 0015 – PROBLEM SOLVING IN PROGRAMMING AND SYSTEM DESIGN

(Foundation in Information Technology)

16 OCTOBER 2017
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **THREE** pages excluding the cover page.
2. Answer **ALL** questions.
3. Write your answers in the Answer Booklet.

Instructions: Answer **ALL** questions. Write your answers in the Answer Booklet.

QUESTION 1 [25 Marks]

a. Take the problem of how to divide 10 cookies of the same shape equally to 4 kids. State and apply the six problem solving steps to solve the problem.

(9 marks)

b. Jojo is a robot that has a very limited knowledge base. In Jojo's knowledge base:
Stand Up – Jojo will stand up from his chair to an upright position.
Sit Down – Jojo will sit down. But you must make sure that the chair is behind him or else he will sit on the floor
Take Step – Jojo will take one step forward
Turn Right – Jojo will turn right 90 degrees.
Based on Jojo's knowledge base, write the instruction to make Jojo (in sitting position) to walk 4 steps forward and sit on a chair at the opposite end. Refer to **Figure 1** below.

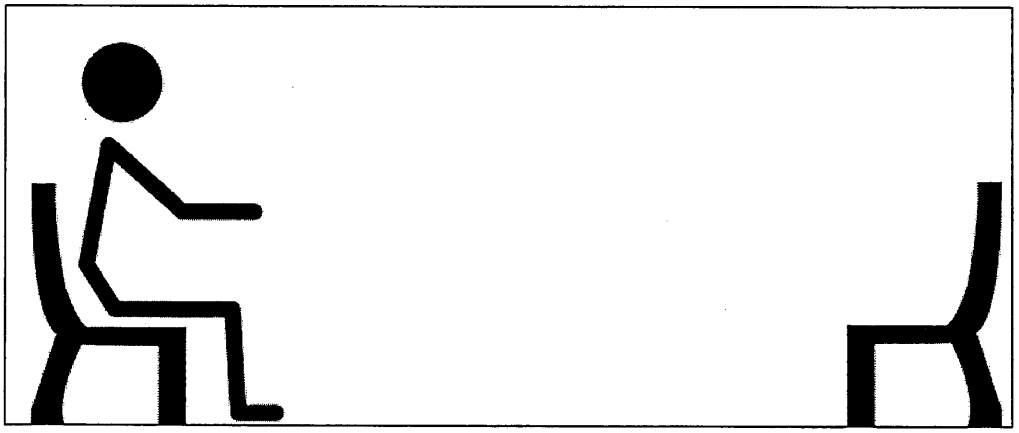

Figure 1

(8 marks)

c. Write the answer for the following expressions
i. False AND 3 > 6 MOD 2
ii. NOT 3+4 == 7 OR True
iii. 9 \ 5 > 1 OR False

(3 marks)

d. Write the following equations in proper computer operators.
i. $3x = y^3 + 3y$

(2.5 marks)

ii. $L = \frac{3A}{2} \times 7$

(2.5 marks)

Continued...

QUESTION 2 [25 Marks]

a. Sam Witwicky wants to buy an Optimus Prime figurine. He only has 2 options; he can buy it online or he can drive 50km to buy it at the mall. He is not sure which would be less expensive; shipping cost to be considered if he buys it online, or fuel and toll costs if he drives to the mall. The figurine is sold for the same price both online and at the mall. If both options cost the same, he will buy it online. Draw a flowchart to help Sam to find the best solution to buy the figurine.

(10 marks)

b. Harrods is doing its annual sale. All items are on discount. Any item with Blue price tag will be given 25% discount, Red tag is 50% discount, and Green tag is 70% discount. If the customer has Harrods membership card, there is an additional 10% discount. If the customer pays with American Express card, there is an additional 7% discount. A customer cannot receive both additional discounts. If the customer has the membership card and wants to pay with American Express card, the discount for Harrods membership will be given. Write a pseudocode to print the sale price of the item.

(15 marks)

QUESTION 3 [25 Marks]

a. You are asked to write a program that will ask a user to enter an account number, and then read from the database to display the opening balance and transactions (payments and deposits made) of the account for last month. The program will calculate the ending balance of the account at the end of the list and update the database.

i. Complete the data dictionary below for the above problem. List of items are given. You only need to provide suitable variable names for the items and their data type.

Items	Variable Name	Data Type
Account number		
Opening balance		
Number of payment		
Number of deposit		
Payment value		
Deposit value		
Ending balance		

(7 marks)

ii. Draw a flowchart for this program using the variable names from the data dictionary.

(18 marks)

Continued...

QUESTION 4 [25 Marks]

Mr. Jones gave a test to his class with 8 students. His test has 20 questions. He needs a program that will calculate the students' grades based on the best score.

Grade:
A will range from the best score, to the best score minus 2.
B will range from the best score minus 3, to the best score minus 5.
C will range from the best score minus 6, to the best score minus 8.
D will range from the best score minus 9, to the best score minus 11.
F will be anything below the best score minus 11.

The table below shows each student's ID and test scores.

Student's ID	1001	1002	1003	1004	1005	1006	1007	1008
Scores	15	7	11	12	17	16	19	13
Grade								

The output will be each student's ID, correct scores, and grade, along with the single highest score for the class.

a. Complete the table by filling in the Grades row. Then draw and name one-dimensional arrays (with data) to hold the data from the table above.

(6 marks)

b. Write the pseudocode for a function definition that determines the best score from the "Scores" array. (Use While-WhileEnd loop structure)

(6 marks)

c. Write the pseudocode for a function definition that determines the grade given the best score. (Use Repeat-Until loop structure)

(13 marks)

End of Paper